

*Cancer Incidence
In
North Carolina
1998*



Central Cancer Registry
State Center for Health Statistics

STATE OF NORTH CAROLINA

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May 2002

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Introduction

Background

The North Carolina Central Cancer Registry (CCR), located within the State Center for Health Statistics, was established in 1986. The CCR operates under the authority granted in North Carolina General Statute 130A-208.

Legislation declaring cancer to be a mandatorily reported disease in N.C. became effective in 1947. Authorized funding for establishing a registry, however, was not appropriated until 1986. Between 1986 and 1989, only 50-60 percent of cancer cases were reported to the CCR each year. Calendar year 1990 is the first year for which relatively complete statewide reporting was achieved. In 1999, new legislation was passed that requires every healthcare provider that detects, diagnoses, or treats cancer cases to report all cases to the CCR.

The CCR collects, analyzes and disseminates demographic and medical characteristic information on newly diagnosed cancer patients in North Carolina. There are 130 hospitals in North Carolina which diagnose and treat cancer patients, approximately 50 of which have their own tumor registries. Of the 130 hospitals, 120 reported their 1998 cancer incidence data to the CCR. Incidence data are reported to the CCR by use of magnetic media.

Purpose

Cancer in North Carolina 1998 is the ninth annual report of the CCR. This report summarizes the information collected on cancer diagnosed among North Carolina residents in 1998. Along with the 1998 incidence data reported from the hospitals, this report includes a small number of melanoma cases that were not hospitalized and that were reported to the CCR by dermatologists. Mortality data were provided by the State Center for Health Statistics.

The last printed publication of cancer incidence data was volume four, 1993 cancer data. Due to problems with our software, we were unable to print volumes five, six, seven, and eight, corresponding to the years 1994 through 1997 respectively. However, these volumes have now been placed on the State Center for Health Statistics web site, www.schs.state.nc.us/SCHS/healthstats/, under the title "N.C. Cancer Incidence Reports."

Confidentiality

The CCR is committed to preserving the confidentiality of information obtained for medical, educational, research, and statistical purposes. Thus the CCR demands strict confidentiality and the protection of the identity of both cancer patients and reporting sources in registry data. The CCR does not release any identifying information regarding any patients, hospitals or physicians without permission from the reporting facility.

Technical Notes

Overview and Definitions

This report presents frequency counts, age-specific rates, and age-adjusted rates to describe newly diagnosed cases of cancer and mortality due to cancer.

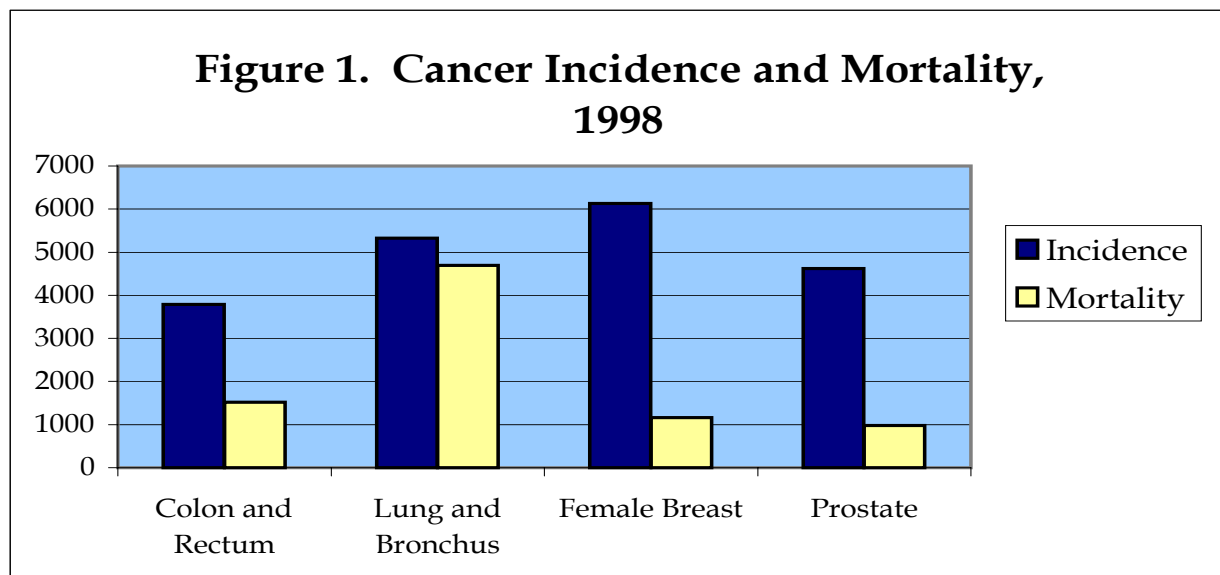
Cancer Incidence and Mortality

Cancer incidence is the number of newly diagnosed cancer cases for each county, whereas cancer mortality is the number of deaths due to cancer for each county (See Figure 1.).

The belief that mortality data are reliable is based on the assumption that death certificates provide complete and accurate data on all causes of death. However, the accuracy of recording the cause of death varies for many cancers. This variability arises partly from the fact that nearly half of all cancers are cured. At the time of death, the history of cancer may not be known by the physician, or the cancer may be considered not to have contributed to the death. Nonetheless, mortality data have been used widely to analyze cancer risk in populations.

Instances of underreporting of cancer incidence are known to have occurred. In some counties, and for some cancers (e.g., melanomas), underreporting may lead to more cancer deaths being shown than anticipated by incidence cases. Also, survival following a cancer diagnosis varies by cancer site. For example, survival for pancreatic cancer is very poor. Less than 10 percent of cases live five years after diagnosis. By contrast, roughly 85 percent of people diagnosed with breast cancer live at least five years. In populations with low use of health care services (e.g., rural and black populations), more cancers are diagnosed at advanced stages when therapies are less successful, or the cases may not be diagnosed until death.

The incidence/mortality ratio is a measure used by the CCR to evaluate its reporting. Overall, this ratio is around 2.0. Depending on the type of cancer, its survival rate, its ability to be detected through screening exams, and the presence of successful treatment options, this value may rise to 3.0 or 3.5 or may drop to about 1.0.



Cancer incidence, mortality, and age-adjusted rates for each county are presented in Table 5 and presented by site in Tables 6-9 for Colon/Rectum, Lung/Bronchus, Female Breast, and Prostate Cancers, respectively.

Differences in Reporting Cancer Incidences and Mortality Data

Many people living near the Virginia border go outside North Carolina for health care. Patients often seek secondary and tertiary care in Norfolk and Danville, Virginia. The State of North Carolina has an exchange agreement with all 50 states for exchanging death certificates, but only has an exchange agreement with 23 states, including our border states of Virginia and South Carolina, for exchanging cancer incidence data.

Because death certificate data are available more quickly than incidence data, the 1998 mortality data include deaths of North Carolina residents who died in other states; however, the incidence data does not include all cases diagnosed out-of-state. As a result, some counties may show more deaths than incidence cases in the data presented in Table 5.

This is a particular problem for the northeastern counties and for Caswell and Rockingham counties. The exchange of data is an ongoing process; updated information will be made available upon request for those counties affected by interstate migration for health care.

As noted above, some counties have been found to underreport their cancer incidence due to poor case-finding procedures. These counties, especially rural counties where small hospitals do not have the services of trained tumor registrars, may have inadequate case-finding. This results in incomplete reporting of new cancer cases. In contrast, death data are considered to be complete. This also contributes to what appears to be an excess of deaths compared to the number of cases for some cancer sites in some of the rural counties.

Incidence Rates

Two types of rates are presented in this report: age-adjusted and age-specific, each of which has a specific purpose. Both rates are expressed in this report as annual or five-year rates per 100,000 population.

An age-adjusted rate accurately describes the cancer experience that the population would have had if it had exactly the same age distribution as compared to the standard population. Age-adjusted rates provide a single, summary rate for each area. The direct method was used to calculate all age-adjusted rates in this report by multiplying each age-specific rate by the number of people within that age group in the standard population, summing these products, and dividing by the total population in the standard population. Age-adjusted rates should not be compared with any other type of rate or be used as absolute measurements of vital events; their sole purpose is to provide summary rates that can be compared between populations that have different age structures. The 2000 U.S. Census population was used in the calculations as the standard population.

The age-specific cancer incidence is the number of cancer cases that occur in each five-year age range, from 0-4 to 85+. Age-specific rates are calculated by dividing the number of cases for a given age group by the total population of that age. They are used to compare rates between population groups

of the same age and to examine age patterns for particular cancers. If the age categories are sufficiently narrow, these rates provide the best estimates of the risk of disease. As expected, age-specific rates have a general tendency to increase with age (See Figure 2). North Carolina has attracted a large number of retirement-age people over the last decade. Understanding migration patterns is important for interpreting the data and is one reason for showing the data by age group. The largest concentrations of older-age residents are in the mountain counties, along the coast, and in the sandhills (along the mid-southern border).

Cancer patterns vary by age group. Children have a very different pattern of cancer than do adults. Leukemia, brain cancer, bone cancer, and lymphomas dominate in people under age 20. In general, North Carolina's pediatric cancer patterns are quite consistent with national patterns.

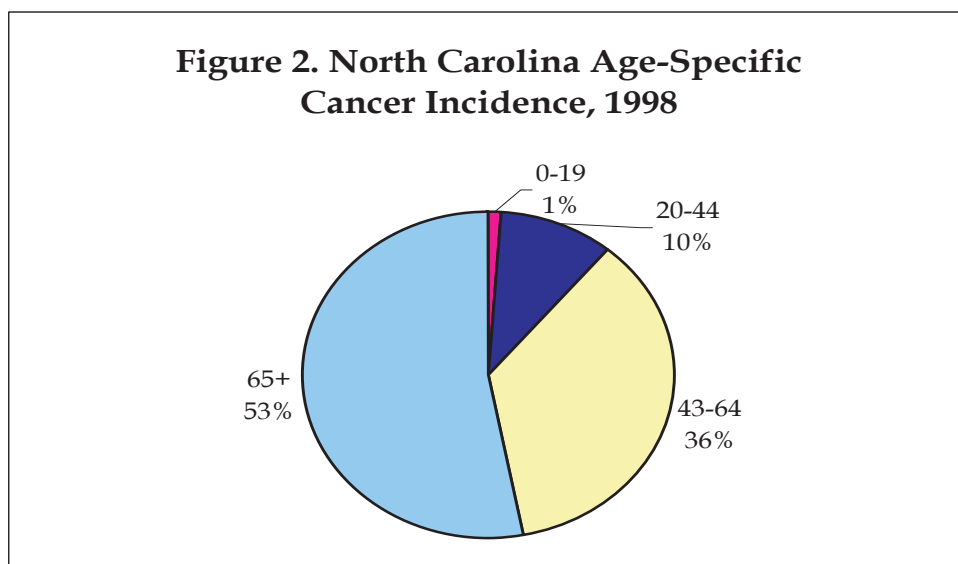
Young adults (20-44) have an entirely different pattern of cancer than do children. In this age group, lymphomas are even more common, as are some digestive and reproductive tissue cancers. All of these cancers are quite rare, and cancer rates in these ages are generally lower than for other age groups.

In the middle ages (45-64), cancer rates begin to rise, and the common cancers (lung, breast, and colon) emerge. The incursion of these cancers into earlier age groups is the subject of considerable research at this time. Much work is in progress in North Carolina on these trends.

All cancer rates are at their maximum in the 65+ age category. Prostate cancer is almost exclusively a disease of older men.

These age-specific patterns offer significant direction for screening priorities. For most cancers, the prospect for a normal life expectancy is good when the diagnosis is made early in the disease process. North Carolina legislation and federal programs are focused on increasing access to screening services in this state. Older and underprivileged people are priority groups for these programs.

As stated previously, age-specific rates provide the best estimates of the risk of disease if the age categories are sufficiently narrow. Age-specific cancer incidences and rates are presented in Table 10. The age-specific incidence rates demonstrate how cancer is a disease primarily of the older population.



Race/Gender Specific

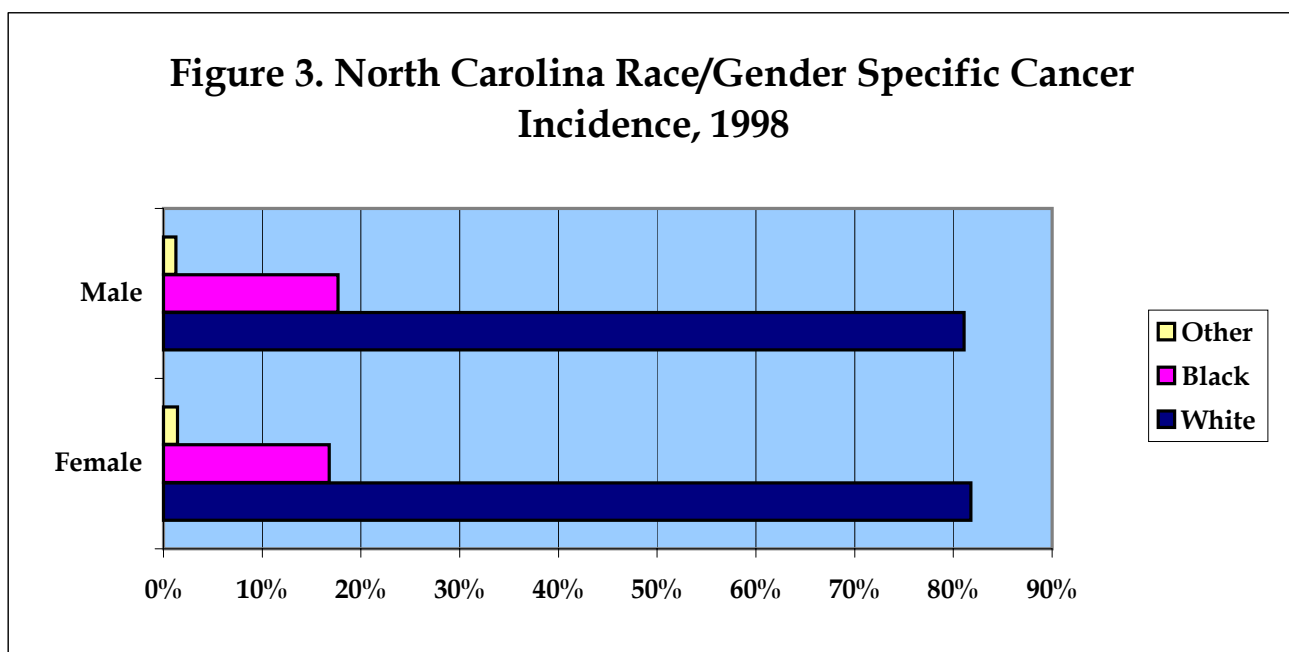
The race/gender-specific cancer incidence is the number of cancer cases that occurred in each race/gender group for each county. (See Figure 3.)

These data are provided because race is a highly relevant factor in interpreting cancer patterns in North Carolina. Earlier, the scarcity of nonwhite cases in many counties was cited as reason for not using site-specific incidence rates by race, as well as by gender; yet, cancer rates do vary by race. Also, race distributions differ across the state, and racial disparity has been observed in the use of health care. Because cancer risk is strongly associated with lifestyle and behavior, differences in ethnic and cultural groups can provide clues to factors involved in the development of cancer such as dietary patterns, alcohol use, and sexual and reproductive behaviors.

Cancer cases and age-adjusted rates by gender for each county are presented in Table 1 and by race for each county in Table 3.

Reliability of Rates

Precautions should always be taken when comparing any rates based on vital events and population. Both the size of the numbers and the characteristics of the population are important indicators of a rate's real value. Rates based on small numbers of events over a given period of time or for sparsely populated geographic areas should be viewed with caution. These rates show considerable variation from year to year, thus limiting their usefulness in comparisons and estimation of rare occurrences. (See section "Small Numbers" or refer to Statistical Primer No. 12, "Problems with Rates Based on Small Numbers" (April 1997) on the SCHS website, www.schs.state.nc.us/SCHS.)



Age-adjusted rates can offer a more refined measurement for comparing experiences over geographic areas or time periods. However, there are limitations to their use; one should be familiar with these types of rates before using them. As already mentioned, age-adjusted rates are only to be used for comparison purposes and only if the same standard population was used in the calculation. This publication uses the 2000 U.S. Census as the standard population.

For assistance in interpreting these data, please contact the statistical staff at the CCR, (919) 715-4555.

Morphology (Cell Type) and Behavior

Interpretations of melanoma data should be treated with caution, since the thoroughness of case-finding is suspect due to the likelihood that cases may be treated outside of hospitals and not reported to the CCR. Data on basal and squamous cell skin cancers are not collected by the CCR unless they have spread to tissue beyond the original site.

Malignant melanoma may occur at many different body sites; however, this report focuses on melanoma of the skin. Also, lymphomas are not grouped consistently by all researchers. The specific morphology codes for these categories have been provided in the Appendix in the table “Primary Site Definitions” to clarify counting of these cases. The lymphoma category includes all lymphoma cases with the morphology codes shown, regardless of body site.

In these data, only malignant brain tumors are included, although data on benign and unspecified types are also reported to the CCR. Only invasive cervical cancer cases have been included; data on in situ cases are collected but are excluded from this report due to suspicions of incompleteness.

Limitations of Data

The user should be cautious when making county-to-county comparisons of the data in this report. Underreporting in areas close to neighboring states and underreporting for cancers that may not be diagnosed in hospitals must be considered when interpreting cancer incidence data. In addition, comparison of rates (computed with the number of cases and population data) is problematic. The age distributions and racial percentages in counties vary considerably. These factors (age, race) have too much effect on the cancer data from county to county to allow useful comparisons of risk.

Consider a comparison of Moore and Cabarrus counties. In 1998, over 22 percent of the Moore County population was at least 65 years old, while less than 14 percent of the Cabarrus County population was 65 and over. A larger proportion of the Moore County population can be expected to have cancer than the Cabarrus County population just because of the difference in the age pattern for these two counties.

On the other hand, over 66 percent of Robeson County’s population was comprised of minorities, while nearly 97 percent of Watauga County’s population is white. This difference in the racial composition of the populations of the two counties can also have a marked influence on the patterns of cancer incidence and mortality. Age-adjusted rates control for differences in the age structures of populations, but they do not control for differences in racial composition.

Small Numbers

Small numbers of cases are a problem for statistical reports of health data. Even for the most common cancers, some counties can expect to have only one or two cases in a year. For example, Tyrrell County, which has the smallest population of any county in the state, can expect to have only one case of female lung cancer each year (based on state lung cancer rates). Between 1995 and 1997, one case of female lung cancer in Tyrrell County has been reported to the CCR. If three cases should be reported in 1998, it would appear that the county had an excessive amount of lung cancer in 1998. However, over the four-year period, the county would average exactly what was expected.

All statistics are subject to chance variation. Rates based on an unusually small or large number of events over a specified period of time or for a sparsely populated geographic area should be of particular concern and caution. When small events or populations are evident in studying rates, multiple-year summary rates will sometimes provide a much better perspective or measurement of an outcome. Expanding the period of time studied enlarges the absolute numbers and adds more credence to a statement regarding a rate.

Interpretation

This descriptive report is intended to serve as a baseline for future reference. Because of the limitations described above, this publication should not be regarded as a definitive description of the cancer incidence in North Carolina. With additional training of hospital staff, the addition of other reporting facilities, and with collaboration from neighboring states, some of the problems of underreporting have declined. Although there are important limitations in the use of these data, the observed number of cases within a gender group in a specific county can be used for:

- planning health services at the county level;
- identifying high incidence of cancer sites within a county;
- educating the public;
- motivating hospitals and other facilities to report incidence data accurately and in a timely manner.

Comparison to National Data

This report provides data for evaluation of cancer incidence and mortality patterns in North Carolina. While comparisons to national data would be desirable, there is no reliable national database for comparison with North Carolina 1998 observed incidence cases.

The National Cancer Institute operates a series of population-based registries (the Surveillance, Epidemiology and End Results [SEER] registries). The most recent available SEER data are for 1973-1998. It is not valid to compare total population rates with the corresponding ones provided by the SEER program, since the racial compositions of the two populations are dissimilar. These SEER registries are intended to provide a 14 percent sample of the nation. The nonwhite population of the SEER registries is mainly urban, while North Carolina's nonwhite population is heavily rural. Differences between cancer rates in urban and rural populations have been observed. However, a comparison of the North Carolina and SEER data may be obtained by request. In general, North Carolina cancer rates are quite consistent with the nation's, except for variations that are most likely due to North Carolina's larger rural and black populations.

Available Cancer Information

Cancer and diabetes are the only two leading causes of death in the United States that are increasing. These increases are largely the result of the aging of the population and the decline in mortality from other causes of death (e.g., heart disease and stroke). It is estimated that by the year 2015, cancer will be the leading cause of death in the U.S.

Cancer is expected to strike one in three people sometime during their lifetime. For more information about cancer, contact a local office of the American Cancer Society or call 1-800-ACS-2345. Many communities also have hospital-based cancer programs through which local data and/or cancer-related services may be obtained. In many counties, local health departments have active cancer control programs. Another source of information on cancer and resources for patients is the Cancer Information Service, at Duke University, 1-800-4CANCER (1-800-422-6237).

The CCR produces other reports on cancer in North Carolina. A notable one is North Carolina Cancer Facts and Figures. This report is published annually in collaboration with the North Carolina Division of the American Cancer Society. Also, other units with the State Center for Health Statistics (SCHS) publish many reports on other diseases and on health care and environmental quality measures. Many reports are available on the SCHS website, www.schs.state.nc.us/SCHS. For more information about other reports from the CCR please call (919) 715-4555. For other sections of the SCHS, please call (919) 733-4728 or write:

State Center for Health Statistics
1908 Mail Service Center
Raleigh, NC 27699-1908

Support for Cancer Research and Control

The CCR is actively involved with cancer research programs at universities in North Carolina, as well as with federal agencies and research institutes located in the state. One feature of this participation is the rapid identification of cancer patients for projects that are designed to collect information before the patient's first course of treatment is completed (e.g., genetic studies). Several organizations in North Carolina work to prevent cancer or to provide for early detection. Others work to promote a higher quality of life for cancer patients undergoing treatment and cancer survivors. Still others are working to understand and reduce disparities in cancer diagnosis and mortality.

One program to promote access to cancer screening tests is the N.C. Division of Public Health's Breast and Cervical Cancer Control Program. The CCR provides statistical and data analysis support for the state's Cancer Control Program, which funds cancer treatment for economically disadvantaged North Carolinians. The CCR is associated with other organizations such as the American Cancer Society and the state's Advisory Committee for Cancer Coordination and Control.

The CCR is in the process of developing a publication outlining its research projects with North Carolina universities and other cancer research institutes.

Cancer Incidence In North Carolina
1998

Evaluation Form

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In an attempt to provide you with the most beneficial information possible, we are enclosing this evaluation form. Please complete the form and mail to the following address: **North Carolina Central Cancer Registry, 1908 Mail Service Center, Raleigh, NC 27699-1908.** We appreciate any feedback you can provide.

Do you feel that the terminology used in this publication is clearly explained in the Introduction of this publication?

What tables/charts do you find most useful and why?

What tables/charts do you find least useful and why?

Please describe in detail any charts/tables you would like to see added to this publication.

Additional comments or suggestions:

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**Table 1: Incidence Rates By Sex
1998**

Site	Males		Females	
	Cases	Rate ¹	Cases	Rate ¹
All Sites	16,644	514.0	16,627	391.4
Oral Cavity and Pharynx	532	15.7	265	6.2
Lip	55	1.6	18	0.4
Tongue	117	3.4	61	1.4
Salivary Glands	49	1.6	25	0.6
Floor of Mouth	57	1.6	24	0.6
Nasopharynx	24	0.7	*	**
Oropharynx	22	0.6	10	0.2
Hypopharynx	59	1.7	18	0.4
Other Mouth & Pharynx	149	4.4	100	2.3
Digestive System	3,068	97.2	2,817	64.1
Esophagus	226	6.8	75	1.7
Stomach	267	8.5	193	4.4
Small Intestine	61	1.8	54	1.2
Colon & Rectum	1,880	59.9	1,911	43.4
Anus & Anal Canal	27	0.8	51	1.2
Liver & Intrahepatic Bile Duct	148	4.6	83	1.9
Gallbladder	18	0.6	31	0.7
Pancreas	390	12.5	357	8.1
Other Digestive Organs	51	1.6	62	1.4
Respiratory System	3,750	115.4	2,100	48.3
Larynx	319	9.6	83	2.0
Lung & Bronchus	3,344	103.1	1,983	45.6
Other Respiratory Organs	87	2.7	34	0.8
Bones and Joints	39	1.1	39	1.0
Soft Tissues	119	3.5	91	2.2
Melanoma of the Skin	573	17.1	462	11.2
Breast	59	1.9	6,132	146.8
Invasive Breast	59	1.9	5,163	123.4
Insitu Breast	-	-	969	23.4
Female Genital System	-	-	1,956	46.6
Cervix Uteri	-	-	373	9.2
Uterus (Corpus, NOS)	-	-	834	19.7
Ovary	-	-	592	14.0
Other Female Genital Organs	-	-	157	3.7
Male Genital System	4,829	147.0	-	-
Prostate	4,625	141.5	-	-
Testis	166	4.3	-	-
Penis	34	1.1	-	-
Other Male Genital Organs	*	**	-	-
Urinary System	1,569	50.4	707	16.2
Bladder	1,002	33.1	374	8.4
Kidney & Renal Pelvis	534	16.0	314	7.4
Ureter	23	0.9	14	0.3
Other Urinary System	10	0.4	*	**
Eye & Orbit	37	1.1	25	0.6
Brain & CNS	242	6.9	226	5.5
Endocrine System	120	3.4	280	7.0
Thyroid	95	2.7	263	6.6
Other Endocrine & Thymus	25	0.7	17	0.4
Lymphomas	719	21.6	633	14.8
Hodgkin's Disease	106	2.9	88	2.2
Non-Hodgkin's Lymphoma	613	18.7	545	12.6
Multiple Myeloma	200	6.4	160	3.7
Leukemia	386	12.0	296	7.1
Acute Lymphocytic Leukemia	44	1.2	38	1.0
Chronic Lymphocytic Leukemia	108	3.4	75	1.7
Acute Myeloid Leukemia	115	3.7	91	2.2
Chronic Myeloid Leukemia	50	1.5	44	1.0
Other Leukemia	69	2.1	48	1.1
Ill-Defined & Unspecified	345	11.3	402	9.1

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

* Less than 10 Cases Observed.

** Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 2: Ten Most Frequently Diagnosed Cancers By Sex
1994-1998**

Males

Cancer	Incidence		Mortality	
	Cases	Rate¹	Cases	Rate¹
Prostate	22069	143.3	4981	41.5
Lung/Bronchus	16963	110.3	14941	99.9
Colon/Rectum	8730	59.1	3588	25.7
Bladder	4595	31.8	884	6.8
Non-Hodgkin's Lymphoma	2757	17.7	1411	9.6
Oral Cavity	2747	17.2	774	5.0
Kidney	2453	15.5	990	6.7
Melanoma(Skin)	2419	15.2	590	4.0
Leukemia	1940	12.7	1465	10.3
Pancreas	1725	11.7	1837	12.7

Females

Cancer	Incidence		Mortality	
	Cases	Rate¹	Cases	Rate¹
Female Breast	27472	138.2	5825	28.7
Lung/Bronchus	9702	46.6	7832	37.3
Colon/Rectum	8818	42.1	3905	18.3
Corpus Uteri	4129	20.3	875	4.1
Ovary	2923	14.6	1744	8.3
Non-Hodgkin's Lymphoma	2581	12.5	1393	6.6
Cervix Uteri	1906	9.8	685	3.4
Melanoma(Skin)	1877	9.5	419	2.1
Pancreas	1730	8.2	1949	9.1
Bladder	1651	7.8	462	2.1

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

Table 3: Incidence Rates By Race
1998

Site	Whites		Minorities	
	Cases	Rate ¹	Cases	Rate ¹
All Sites	27,072	435.4	6,130	441.2
Oral Cavity & Pharynx	615	9.9	179	12.4
Lip	71	1.1	*	**
Tongue	135	2.2	42	2.9
Salivary Glands	63	1.0	11	0.7
Floor of Mouth	56	0.9	25	1.7
Nasopharynx	24	0.4	*	**
Oropharynx	23	0.4	*	**
Hypopharynx	45	0.7	31	2.2
Other Mouth & Pharynx	198	3.2	50	3.5
Digestive System	4,614	74.3	1,262	93.7
Esophagus	220	3.5	82	5.9
Stomach	299	4.8	161	12.0
Small Intestine	86	1.4	29	2.1
Colon & Rectum	3,054	49.1	729	54.4
Anus & Anal Canal	66	1.1	12	0.9
Liver & Intrahepatic Bile Duct	183	2.9	46	3.3
Gallbladder	32	0.5	17	1.3
Pancreas	578	9.3	168	12.6
Other Digestive Organs	96	1.6	18	1.3
Respiratory System	4,892	77.3	954	69.8
Larynx	308	4.9	93	6.6
Lung & Bronchus	4,480	70.7	844	61.9
Other Respiratory Organs	104	1.7	17	1.2
Bones and Joints	62	1.1	16	0.9
Soft Tissues	157	2.6	53	3.2
Melanoma of the Skin	1,016	16.7	12	0.9
Breast	5,038	81.9	1,143	79.6
Invasive Breast	4,244	68.9	968	67.3
In Situ Breast	794	12.9	175	12.3
Female Genital System	1,586	25.8	365	26.1
Cervix Uteri	258	4.3	114	7.8
Uterus (Corpus, NOS)	700	11.3	131	9.5
Ovary	497	8.1	94	6.8
Other Female Genital Organs	131	2.2	26	2.0
Male Genital System	3,676	57.6	1,136	84.5
Prostate	3,494	54.6	1,115	83.2
Testis	152	2.6	13	0.7
Penis	26	0.4	*	**
Other Male Genital Organs	*	**	*	**
Urinary System	1,962	31.5	309	22.5
Bladder	1,245	20.0	126	9.6
Kidney & Renal Pelvis	670	10.8	178	12.6
Ureter	35	0.6	*	**
Other Urinary System	12	0.2	*	**
Eye & Orbit	54	0.9	8	0.4
Brain & CNS	415	6.9	52	3.3
Endocrine System	319	5.3	78	4.9
Thyroid	288	4.8	67	4.2
Other Endocrine & Thymus	31	0.5	11	0.7
Lymphomas	1,152	18.8	201	13.0
Hodgkin's Disease	151	2.5	43	2.4
Non-Hodgkin's Lymphoma	1,001	16.3	158	10.6
Multiple Myeloma	252	4.1	106	7.7
Leukemia	573	9.5	107	7.4
Acute Lymphocytic Leukemia	70	1.3	12	0.6
Chronic Lymphocytic Leukemia	153	2.5	30	2.3
Acute Myeloid Leukemia	180	3.0	25	1.8
Chronic Myeloid Leukemia	76	1.2	18	1.2
Other Leukemia	94	1.6	22	1.5
Ill-Defined & Unspecified	604	9.8	141	10.4

¹ Rates Per 100,000 Population

Age-Adjusted to the 2000 U.S. Census

* Less than 10 cases observed.

** Rates based on less than 10 cases are unstable and therefore suppressed.

**Table 4: Ten Most Frequently Diagnosed Cancers By Race
1994-1998**

<i>Whites</i>				
Cancer	Incidence		Mortality	
	Cases	Rate¹	Cases	Rate¹
Female Breast	22469	140.8	4345	26.3
Lung/Bronchus	22162	73.4	18674	62.1
Prostate	16731	129.1	3216	32.8
Colon/Rectum	14204	48.3	5769	19.9
Bladder	5629	19.0	1126	3.9
Non-Hodgkin's Lymphoma	4559	15.5	2419	8.3
Melanoma(Skin)	4208	14.4	970	3.3
Corpus Uteri	3399	20.9	596	3.5
Kidney	3141	10.6	1244	4.2
Oral Cavity	3115	10.6	839	2.9

<i>Minorities</i>				
Cancer	Incidence		Mortality	
	Cases	Rate¹	Cases	Rate¹
Prostate	5230	212.1	1765	86.5
Female Breast	4950	124.6	1480	37.7
Lung/Bronchus	4490	69.1	4099	63.9
Colon/Rectum	3318	51.9	1724	27.6
Oral Cavity	916	13.5	330	4.9
Pancreas	853	13.5	957	15.3
Non-Hodgkin's Lymphoma	770	11.0	385	5.8
Kidney	750	11.0	315	4.8
Corpus Uteri	721	18.2	279	7.1
Stomach	717	11.3	548	8.8

¹Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

**Table 5: Cancer Incidence And Mortality Rates
1998**

County	Incidence		Mortality	
	Cases	Rate ¹	Cases	Rate ¹
North Carolina	33282	437.6	15327	204.0
Alamance	581	411.7	273	190.0
Alexander	154	474.9	70	219.1
Alleghany	63	447.4	32	220.2
Anson	107	392.7	54	190.9
Ashe	126	396.5	69	202.0
Avery	55	300.3	29	152.9
Beaufort	206	404.5	106	202.4
Bertie	96	426.5	50	222.0
Bladen	95	273.5	66	183.5
Brunswick	339	389.5	149	178.6
Buncombe	905	388.5	482	200.4
Burke	416	444.2	193	204.5
Cabarrus	591	474.5	237	191.8
Caldwell	347	428.6	145	181.4
Camden	30	394.5	20	300.3
Carteret	389	548.1	159	229.0
Caswell	98	368.7	70	254.0
Catawba	661	482.3	292	218.0
Chatham	172	319.2	112	205.7
Cherokee	107	331.0	74	222.7
Chowan	71	371.3	36	187.5
Clay	16	132.8	24	186.3
Cleveland	470	456.1	229	223.5
Columbus	222	374.6	118	200.2
Craven	494	574.1	201	235.9
Cumberland	878	427.3	408	216.2
Currituck	82	465.1	37	212.9
Dare	153	537.4	43	153.7
Davidson	590	399.0	253	172.1
Davie	164	446.6	71	189.1
Duplin	219	452.1	101	208.5
Durham	814	489.4	404	250.4
Edgecombe	148	274.6	133	248.3
Forsyth	1588	536.7	628	212.9
Franklin	139	313.8	88	202.4
Gaston	875	480.3	362	201.1
Gates	31	275.0	25	233.5
Graham	25	256.5	17	166.5
Granville	165	366.5	112	253.5
Greene	70	349.4	29	149.2
Guilford	2047	522.0	776	199.7
Halifax	281	470.8	129	214.8
Harnett	302	379.5	178	227.1
Haywood	273	374.6	137	176.0
Henderson	571	461.1	232	185.2
Hertford	133	550.4	58	237.9
Hoke	80	311.9	44	185.2
Hyde	22	313.2	12	161.7
Iredell	526	430.5	223	183.2
Jackson	96	285.6	74	215.0

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

MORTALITY

**Table 5: Cancer Incidence And Mortality Rates
1998**

County	Incidence		Mortality	
	Cases	Rate ¹	Cases	Rate ¹
Johnston	421	386.0	230	213.1
Jones	52	478.1	29	264.3
Lee	221	415.4	107	203.7
Lenoir	359	548.3	137	204.0
Lincoln	264	439.6	119	201.4
McDowell	169	356.4	102	213.4
Macon	147	310.8	69	147.1
Madison	95	410.1	39	157.7
Martin	98	334.9	63	211.5
Mecklenburg	2383	458.2	970	200.5
Mitchell	67	328.9	46	220.0
Montgomery	118	463.9	62	250.5
Moore	416	393.9	215	190.6
Nash	473	535.9	176	199.9
New Hanover	783	496.2	301	193.4
Northampton	103	388.1	52	185.8
Onslow	425	538.0	169	249.1
Orange	375	435.4	181	222.6
Pamlico	87	492.0	43	238.1
Pasquotank	166	461.1	68	185.0
Pender	191	434.2	85	197.0
Perquimans	55	360.4	35	226.3
Person	122	329.0	70	185.4
Pitt	501	487.2	203	202.9
Polk	106	385.8	45	157.7
Randolph	445	346.3	233	183.7
Richmond	217	446.0	98	194.9
Robeson	337	326.6	216	218.4
Rockingham	492	481.7	243	233.5
Rowan	485	347.0	289	201.1
Rutherford	341	483.1	152	209.4
Sampson	230	386.3	122	201.9
Scotland	148	448.8	58	178.6
Stanly	310	506.6	117	185.8
Stokes	189	423.1	96	220.2
Surry	398	492.9	185	224.8
Swain	47	335.7	28	189.2
Transylvania	149	356.5	94	213.3
Tyrrell	23	482.8	8	151.4
Union	314	324.3	182	203.8
Vance	189	459.4	118	283.0
Wake	1985	453.4	760	191.9
Warren	76	313.4	65	254.0
Washington	43	286.4	54	362.2
Watauga	168	455.9	69	185.7
Wayne	493	465.7	247	241.1
Wilkes	320	445.1	142	196.3
Wilson	316	430.5	161	223.5
Yadkin	209	500.2	80	185.9
Yancey	78	365.3	30	129.3

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

COLON/RECTUM

**Table 6: Colon/Rectum Incidence Rates
1998**

<i>County</i>	<i>Cases</i>	<i>Rate¹</i>
<i>North Carolina</i>	3792	50.3
<i>Alamance</i>	72	50.1
<i>Alexander</i>	13	41.1
<i>Alleghany</i>	*	**
<i>Anson</i>	19	70.1
<i>Ashe</i>	18	52.3
<i>Avery</i>	*	**
<i>Beaufort</i>	33	63.9
<i>Bertie</i>	19	84.3
<i>Bladen</i>	12	34.2
<i>Brunswick</i>	30	34.5
<i>Buncombe</i>	107	45
<i>Burke</i>	40	42.7
<i>Cabarrus</i>	45	36.2
<i>Caldwell</i>	36	44.6
<i>Camden</i>	*	**
<i>Carteret</i>	38	56.4
<i>Caswell</i>	*	**
<i>Catawba</i>	87	64.9
<i>Chatham</i>	20	36.5
<i>Cherokee</i>	15	42.1
<i>Chowan</i>	*	**
<i>Clay</i>	*	**
<i>Cleveland</i>	57	55
<i>Columbus</i>	31	51.8
<i>Craven</i>	63	71.2
<i>Cumberland</i>	102	53.8
<i>Currituck</i>	12	75.1
<i>Dare</i>	17	63.2
<i>Davidson</i>	68	46.6
<i>Davie</i>	17	45
<i>Duplin</i>	22	44.9
<i>Durham</i>	80	48.3
<i>Edgecombe</i>	17	31.9
<i>Forsyth</i>	168	57
<i>Franklin</i>	11	24.7
<i>Gaston</i>	117	65.1
<i>Gates</i>	*	**
<i>Graham</i>	*	**
<i>Granville</i>	13	29.1
<i>Greene</i>	11	55.7
<i>Guilford</i>	195	49.7
<i>Halifax</i>	50	83.4
<i>Harnett</i>	48	60.8
<i>Haywood</i>	29	39.3
<i>Henderson</i>	64	49.9
<i>Hertford</i>	21	85.2
<i>Hoke</i>	*	**
<i>Hyde</i>	*	**
<i>Iredell</i>	61	49.6
<i>Jackson</i>	*	**

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

* Less than 10 cases observed

** Rates based on less than 10 cases are unstable and therefore suppressed.

COLON/RECTUM

**Table 6: Colon/Rectum Incidence Rates
1998**

<i>County</i>	<i>Cases</i>	<i>Rate¹</i>
<i>Johnston</i>	44	40.6
<i>Jones</i>	*	**
<i>Lee</i>	28	54.3
<i>Lenoir</i>	60	92.6
<i>Lincoln</i>	34	57.2
<i>McDowell</i>	30	63
<i>Macon</i>	18	36
<i>Madison</i>	10	38.5
<i>Martin</i>	17	57
<i>Mecklenburg</i>	226	45.6
<i>Mitchell</i>	12	53.3
<i>Montgomery</i>	11	43.8
<i>Moore</i>	53	47.2
<i>Nash</i>	74	84.7
<i>New Hanover</i>	90	57.4
<i>Northampton</i>	17	65.2
<i>Onslow</i>	41	58.9
<i>Orange</i>	29	34.3
<i>Pamlico</i>	*	**
<i>Pasquotank</i>	22	61
<i>Pender</i>	17	39.3
<i>Perquimans</i>	*	**
<i>Person</i>	11	29.6
<i>Pitt</i>	61	62
<i>Polk</i>	10	35
<i>Randolph</i>	47	37
<i>Richmond</i>	36	72.6
<i>Robeson</i>	28	28.5
<i>Rockingham</i>	60	57.7
<i>Rowan</i>	56	39.8
<i>Rutherford</i>	42	57.5
<i>Sampson</i>	43	72.8
<i>Scotland</i>	15	46.9
<i>Stanly</i>	43	70.4
<i>Stokes</i>	17	40
<i>Surry</i>	45	55.3
<i>Swain</i>	*	**
<i>Transylvania</i>	18	37.3
<i>Tyrrell</i>	*	**
<i>Union</i>	40	43.6
<i>Vance</i>	20	48.7
<i>Wake</i>	180	44.3
<i>Warren</i>	11	44.8
<i>Washington</i>	10	64.8
<i>Watauga</i>	20	53.7
<i>Wayne</i>	64	62.7
<i>Wilkes</i>	43	59.3
<i>Wilson</i>	36	49.9
<i>Yadkin</i>	25	59.2
<i>Yancey</i>	*	**

¹ Rates Per 100,000 Population

Age-Adjusted to the 2000 U.S. Census

* Less than 10 cases observed

** Rates based on less than 10 cases are unstable and therefore suppressed.

L U N G / B R O N C H U S

**Table 7: Lung/Bronchus Incidence Rates
1998**

<i>County</i>	<i>Cases</i>	<i>Rate¹</i>
<i>North Carolina</i>	5328	69.4
<i>Alamance</i>	85	59.1
<i>Alexander</i>	29	86.3
<i>Alleghany</i>	*	**
<i>Anson</i>	12	42.1
<i>Ashe</i>	18	54.5
<i>Avery</i>	*	**
<i>Beaufort</i>	39	73.8
<i>Bertie</i>	13	55.1
<i>Bladen</i>	20	54.7
<i>Brunswick</i>	74	79.2
<i>Buncombe</i>	122	51.4
<i>Burke</i>	75	77.9
<i>Cabarrus</i>	97	77.2
<i>Caldwell</i>	50	61.1
<i>Camden</i>	*	**
<i>Carteret</i>	75	100.7
<i>Caswell</i>	18	65.1
<i>Catawba</i>	105	75.8
<i>Chatham</i>	20	36.9
<i>Cherokee</i>	20	59.6
<i>Chowan</i>	*	**
<i>Clay</i>	*	**
<i>Cleveland</i>	82	77.8
<i>Columbus</i>	51	86.4
<i>Craven</i>	72	83.7
<i>Cumberland</i>	162	80.6
<i>Currituck</i>	17	94.4
<i>Dare</i>	18	67.8
<i>Davidson</i>	100	65.6
<i>Davie</i>	25	65.8
<i>Duplin</i>	36	72.3
<i>Durham</i>	133	82
<i>Edgecombe</i>	20	37
<i>Forsyth</i>	255	85.3
<i>Franklin</i>	22	49.2
<i>Gaston</i>	162	87.7
<i>Gates</i>	*	**
<i>Graham</i>	*	**
<i>Granville</i>	30	66.3
<i>Greene</i>	*	**
<i>Guilford</i>	315	80.3
<i>Halifax</i>	44	72
<i>Harnett</i>	48	59.4
<i>Haywood</i>	45	59.9
<i>Henderson</i>	84	65.4
<i>Hertford</i>	21	85.5
<i>Hoke</i>	17	69.1
<i>Hyde</i>	*	**
<i>Iredell</i>	86	69.3
<i>Jackson</i>	17	47.9

Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

* Less than 10 cases observed

** Rates based on less than 10 cases are unstable and therefore suppressed.

L U N G / B R O N C H U S

**Table 7: Lung/Bronchus Incidence Rates
1998**

<i>County</i>	<i>Cases</i>	<i>Rate¹</i>
<i>Johnston</i>	87	79
<i>Jones</i>	*	**
<i>Lee</i>	34	63
<i>Lenoir</i>	57	84.8
<i>Lincoln</i>	37	62.2
<i>McDowell</i>	33	67.6
<i>Macon</i>	19	39.2
<i>Madison</i>	16	66.4
<i>Martin</i>	13	43
<i>Mecklenburg</i>	338	67.7
<i>Mitchell</i>	*	**
<i>Montgomery</i>	19	74
<i>Moore</i>	69	58.3
<i>Nash</i>	78	87.2
<i>New Hanover</i>	114	71.9
<i>Northampton</i>	20	73.3
<i>Onslow</i>	85	113.6
<i>Orange</i>	35	43.2
<i>Pamlico</i>	16	93
<i>Pasquotank</i>	20	52.3
<i>Pender</i>	36	78.2
<i>Perquimans</i>	14	95.8
<i>Person</i>	17	44.7
<i>Pitt</i>	77	76.1
<i>Polk</i>	17	60.7
<i>Randolph</i>	77	59.5
<i>Richmond</i>	47	92.9
<i>Robeson</i>	59	56.6
<i>Rockingham</i>	100	95.8
<i>Rowan</i>	94	66.4
<i>Rutherford</i>	57	78.7
<i>Sampson</i>	34	55.5
<i>Scotland</i>	20	60.1
<i>Stanly</i>	44	70.8
<i>Stokes</i>	34	74.7
<i>Surry</i>	72	86.2
<i>Swain</i>	*	**
<i>Transylvania</i>	19	46.7
<i>Tyrrell</i>	*	**
<i>Union</i>	37	39.7
<i>Vance</i>	43	104
<i>Wake</i>	236	57.5
<i>Warren</i>	14	57
<i>Washington</i>	*	**
<i>Watauga</i>	24	63.7
<i>Wayne</i>	101	94.5
<i>Wilkes</i>	52	69.3
<i>Wilson</i>	52	69.5
<i>Yadkin</i>	34	77.4
<i>Yancey</i>	14	63.5

Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

* Less than 10 cases observed

** Rates based on less than 10 cases are unstable and therefore suppressed.

F E M A L E B R E A S T

**Table 8: Female Breast Incidence Rate
1998**

County	Cases	Rate ¹
<i>North Carolina</i>	6134	146.9
<i>Alamance</i>	98	128.9
<i>Alexander</i>	30	168.3
<i>Alleghany</i>	15	205.1
<i>Anson</i>	29	185.4
<i>Ashe</i>	15	96.4
<i>Avery</i>	*	**
<i>Beaufort</i>	38	132.2
<i>Bertie</i>	23	193
<i>Bladen</i>	24	132.1
<i>Brunswick</i>	39	92.2
<i>Buncombe</i>	176	141.8
<i>Burke</i>	66	130.1
<i>Cabarrus</i>	104	151.6
<i>Caldwell</i>	66	148.6
<i>Camden</i>	*	**
<i>Carteret</i>	87	235.8
<i>Caswell</i>	16	118.6
<i>Catawba</i>	121	160.4
<i>Chatham</i>	37	123.3
<i>Cherokee</i>	18	113.9
<i>Chowan</i>	14	132.2
<i>Clay</i>	*	**
<i>Cleveland</i>	68	118.2
<i>Columbus</i>	30	96.4
<i>Craven</i>	93	202.1
<i>Cumberland</i>	174	146.1
<i>Currituck</i>	12	127
<i>Dare</i>	23	153
<i>Davidson</i>	112	140.4
<i>Davie</i>	27	141.2
<i>Duplin</i>	30	117.4
<i>Durham</i>	179	185.5
<i>Edgecombe</i>	29	89.5
<i>Forsyth</i>	289	173.1
<i>Franklin</i>	35	145.6
<i>Gaston</i>	159	158.2
<i>Gates</i>	*	**
<i>Graham</i>	*	**
<i>Granville</i>	27	111.8
<i>Greene</i>	*	**
<i>Guilford</i>	375	170.3
<i>Halifax</i>	40	123.4
<i>Harnett</i>	51	121.7
<i>Haywood</i>	52	141.7
<i>Henderson</i>	108	168.9
<i>Hertford</i>	23	171.9
<i>Hoke</i>	*	**
<i>Hyde</i>	*	**
<i>Iredell</i>	81	122.6
<i>Jackson</i>	18	100.1

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census
* Less than 10 cases observed

** Rates based on less than 10 cases are unstable and therefore suppressed.

F E M A L E B R E A S T

**Table 8: Female Breast Incidence Rates
1998**

County	Cases	Rate ¹
Johnston	68	115.3
Jones	*	**
Lee	35	122.2
Lenoir	69	182.9
Lincoln	45	140.3
McDowell	25	96.2
Macon	24	111
Madison	17	130.7
Martin	23	144.2
Mecklenburg	490	163.2
Mitchell	*	**
Montgomery	29	220.6
Moore	74	137.9
Nash	81	162.3
New Hanover	124	143.7
Northampton	12	85.9
Onslow	68	159.5
Orange	103	210
Pamlico	10	113.7
Pasquotank	28	139.8
Pender	30	131.2
Perquimans	*	**
Person	25	130.4
Pitt	116	195.2
Polk	25	184.1
Randolph	67	94.9
Richmond	32	120.4
Robeson	50	85.2
Rockingham	90	156.3
Rowan	80	106.6
Rutherford	61	161.8
Sampson	36	111.4
Scotland	25	131
Stanly	59	172.1
Stokes	29	120
Surry	73	166.6
Swain	*	**
Transylvania	27	134.3
Tyrrell	*	**
Union	62	113.7
Vance	24	103.9
Wake	470	181.9
Warren	16	124.9
Washington	*	**
Watauga	26	129.1
Wayne	75	127.1
Wilkes	44	115.1
Wilson	76	183.9
Yadkin	33	145.5
Yancey	17	156.8

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

* Less than 10 cases observed

** Rates based on less than 10 cases are unstable and therefore suppressed.

P R O S T A T E

**Table 9: Prostate Incidence Rates
1998**

County	Cases	Rate ¹
North Carolina	4625	141.5
Alamance	96	161.8
Alexander	11	80.9
Alleghany	*	**
Anson	*	**
Ashe	23	152.1
Avery	*	**
Beaufort	19	78.5
Bertie	14	146.1
Bladen	*	**
Brunswick	53	113.9
Buncombe	120	116.4
Burke	51	125.3
Cabarrus	84	158.7
Caldwell	39	112
Camden	*	**
Carteret	68	197.2
Caswell	15	119.3
Catawba	84	139.1
Chatham	27	113.8
Cherokee	13	87.2
Chowan	11	126.1
Clay	*	**
Cleveland	69	162
Columbus	19	69
Craven	94	243
Cumberland	108	120.5
Currituck	*	**
Dare	25	173.9
Davidson	77	118.7
Davie	21	129.4
Duplin	36	162.1
Durham	138	212.9
Edgecombe	20	92.3
Forsyth	211	174
Franklin	19	94.2
Gaston	110	145.2
Gates	*	**
Graham	*	**
Granville	23	119.4
Greene	11	124.3
Guilford	314	190.2
Halifax	39	151.8
Harnett	35	107.2
Haywood	31	87.8
Henderson	76	123.7
Hertford	24	246.8
Hoke	14	114.7
Hyde	*	**
Iredell	98	184.8
Jackson	21	140.2

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

* Less than 10 cases observed

** Rates based on less than 10 cases are unstable and therefore suppressed.

P R O S T A T E

**Table 9: Prostate Incidence Rates
1998**

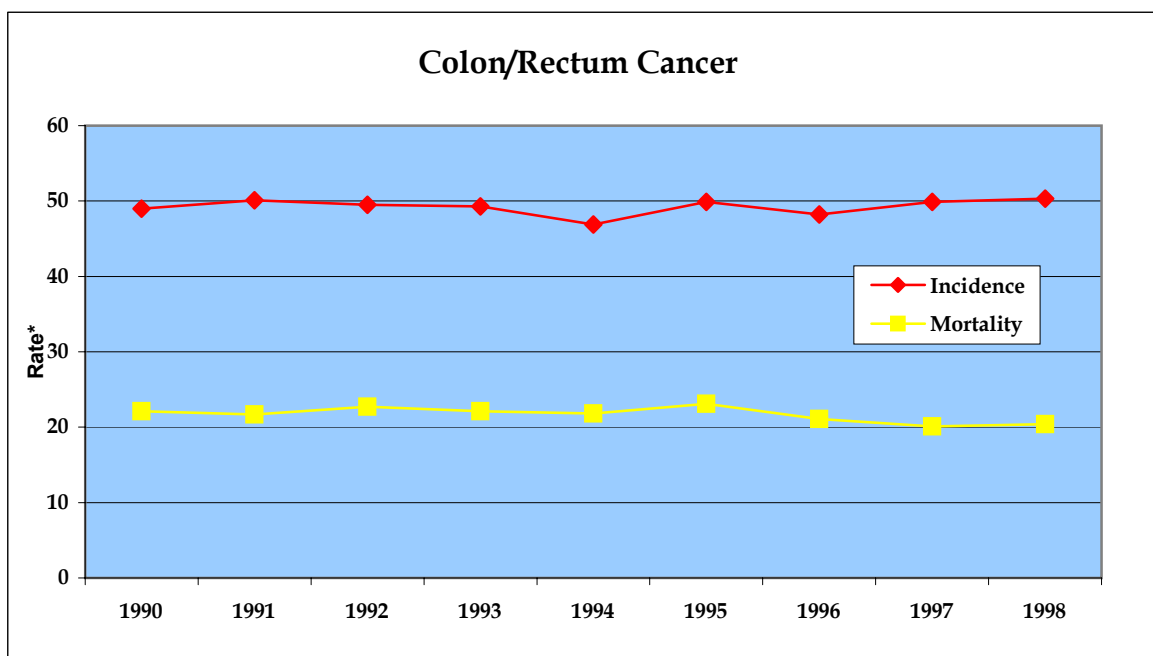
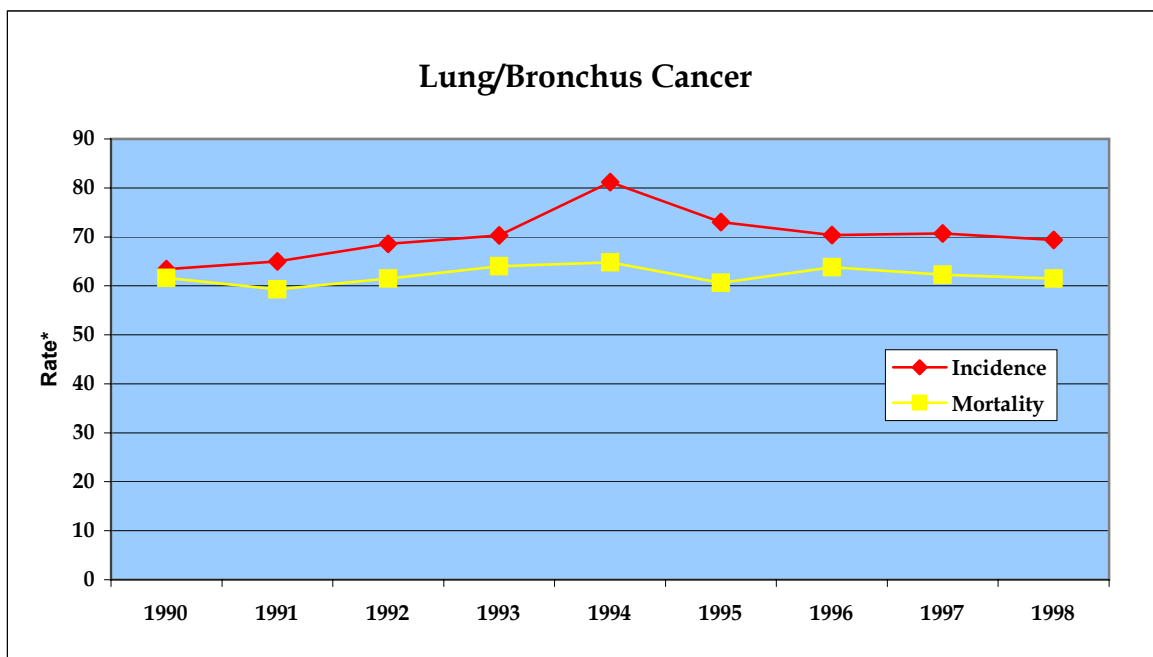
County	Cases	Rate ¹
Johnston	48	100.2
Jones	10	209.1
Lee	25	95
Lenoir	51	195.9
Lincoln	34	135
McDowell	20	91.6
Macon	26	114.3
Madison	*	**
Martin	11	85.9
Mecklenburg	326	153.6
Mitchell	*	**
Montgomery	13	116.2
Moore	61	111.2
Nash	63	187.5
New Hanover	107	156.6
Northampton	26	224.3
Onslow	66	211.1
Orange	57	159.2
Pamlico	26	307.1
Pasquotank	27	184.8
Pender	23	116.6
Perquimans	11	150.3
Person	14	94.1
Pitt	54	128.3
Polk	*	**
Randolph	65	116.3
Richmond	17	84.1
Robeson	60	141.9
Rockingham	54	126.7
Rowan	63	99.7
Rutherford	47	149.9
Sampson	34	128.4
Scotland	34	272.1
Stanly	41	155.2
Stokes	22	109.2
Surry	46	132.3
Swain	10	141.8
Transylvania	25	125.2
Tyrrell	*	**
Union	36	76.6
Vance	25	153.9
Wake	281	160.2
Warren	13	109.9
Washington	*	**
Watauga	24	145.7
Wayne	71	166.5
Wilkes	33	104.8
Wilson	37	113.2
Yadkin	39	210.8
Yancey	10	94.7

¹ Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

* Less than 10 cases observed

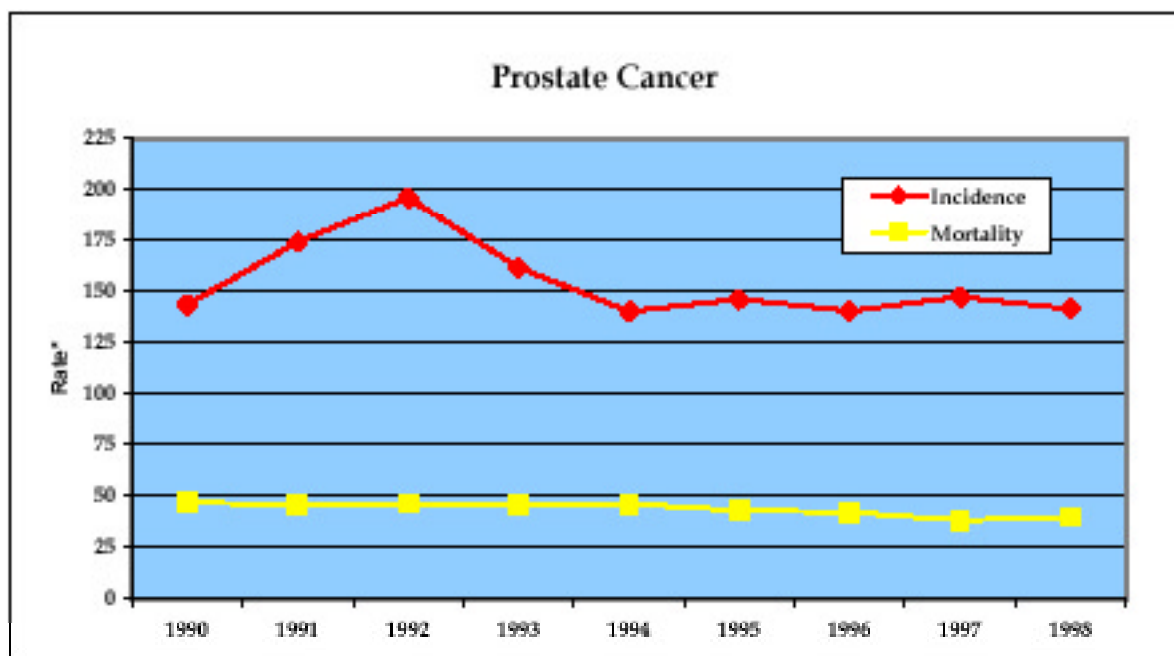
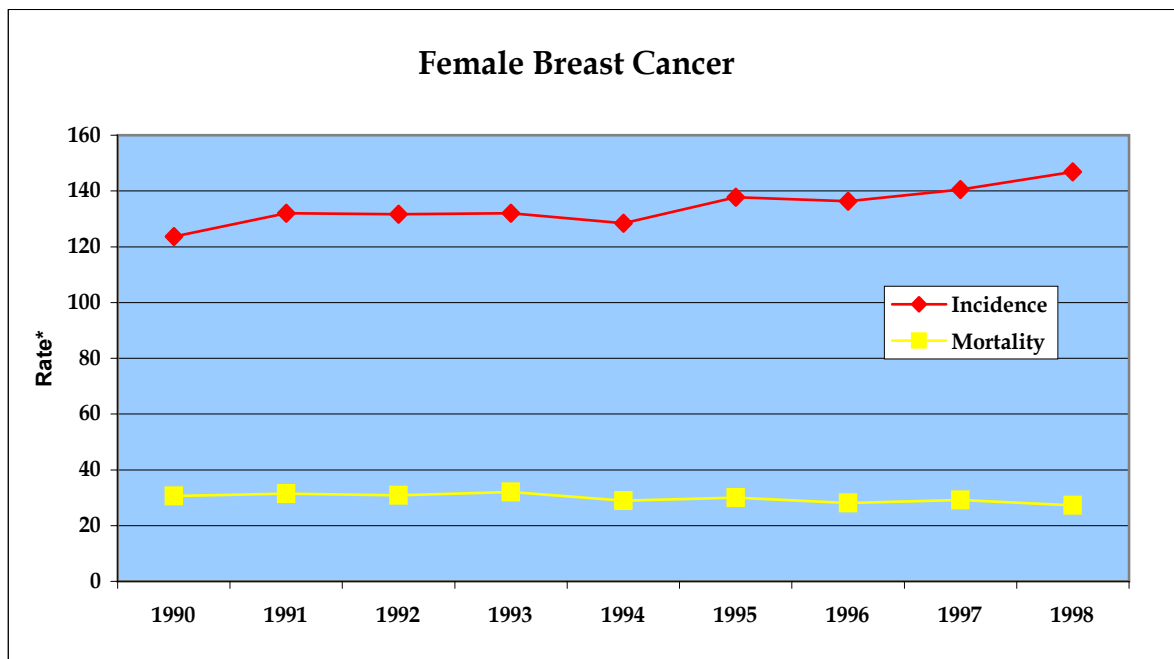
** Rates based on less than 10 cases are unstable and therefore suppressed.

**Chart 1: Trends For The Four Major Cancers
1990-1998**



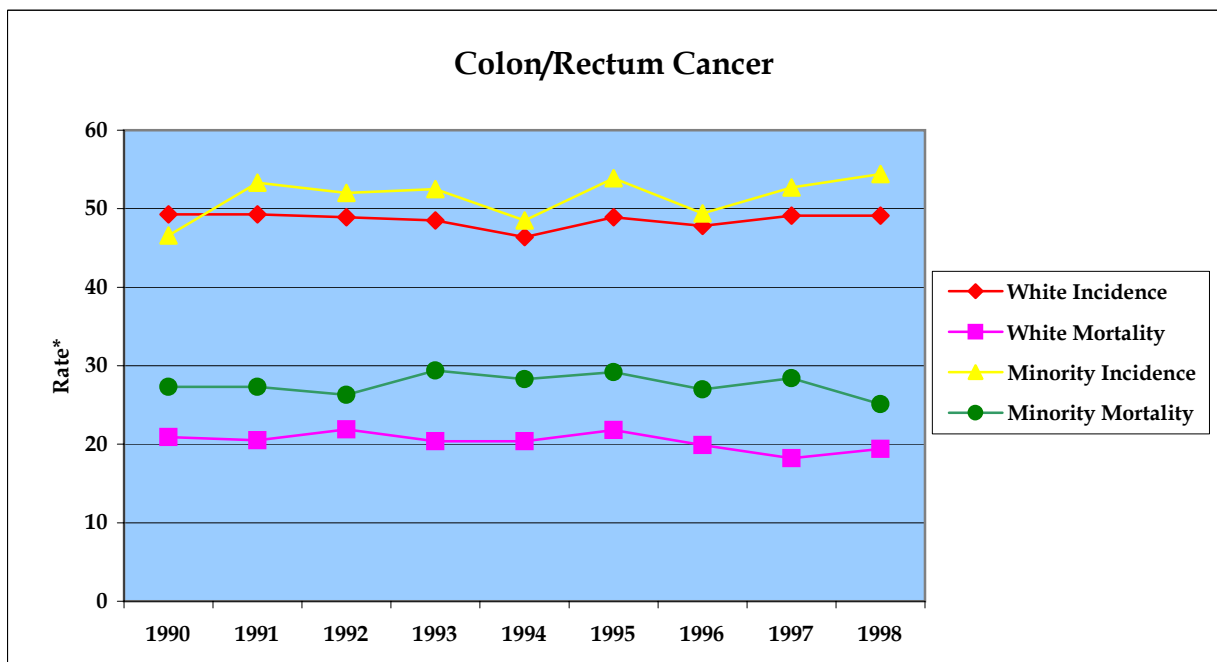
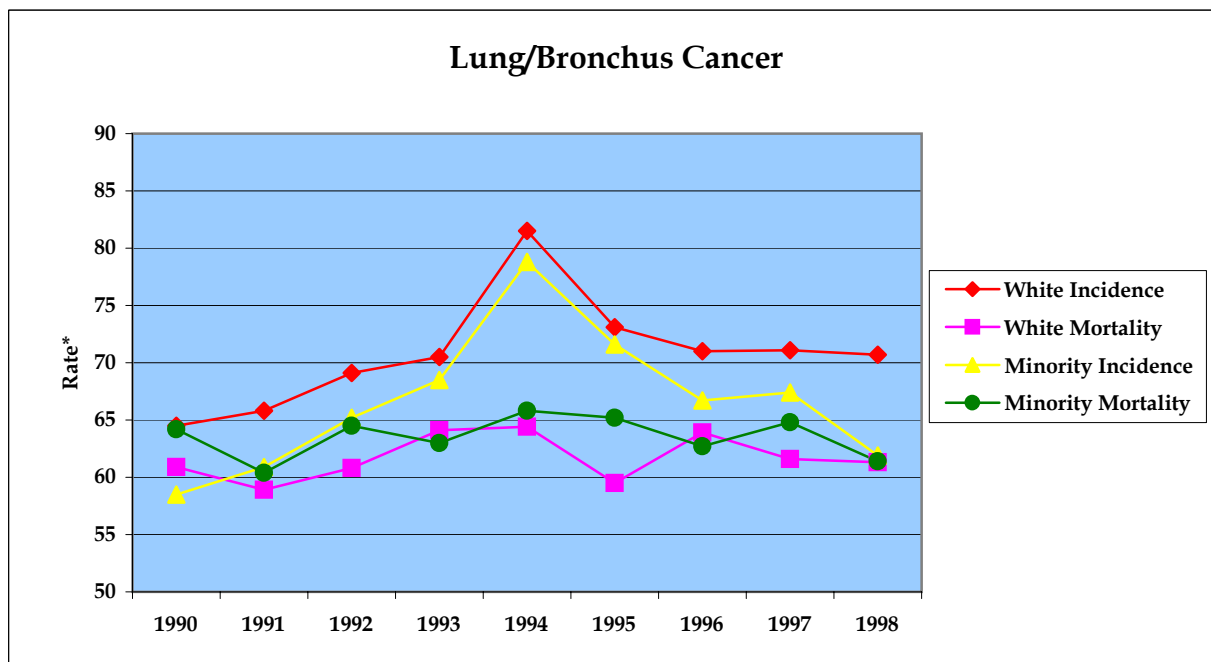
* Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

**Chart 1: Trends For The Four Major Cancers
1990-1998**



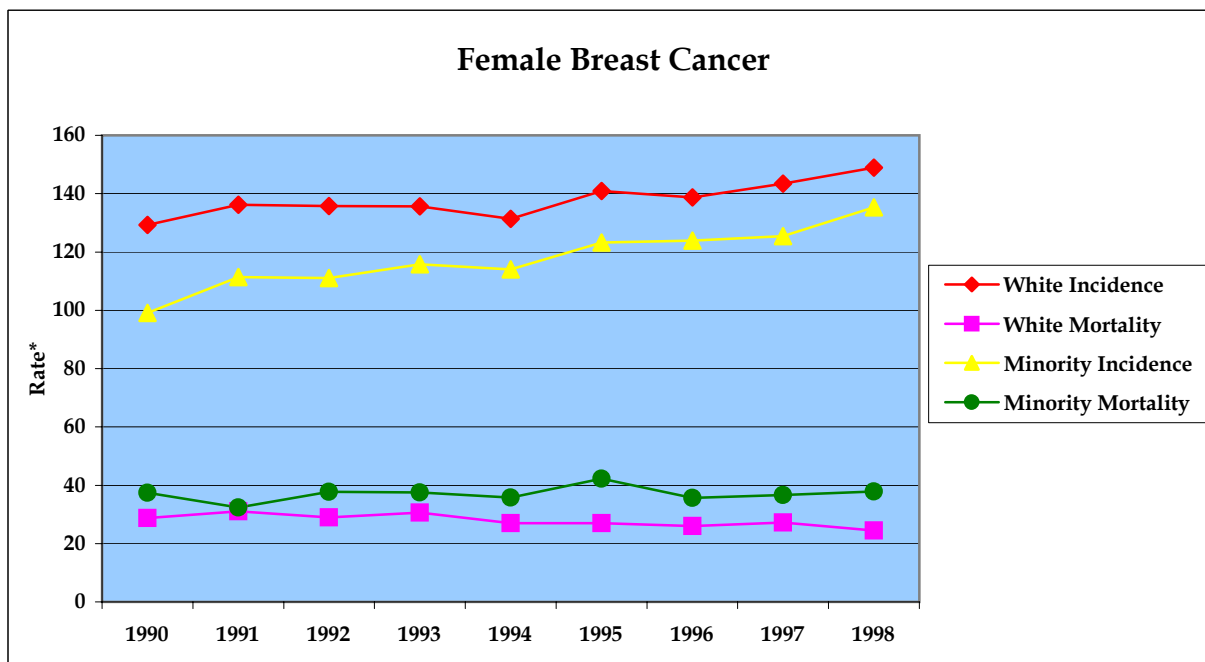
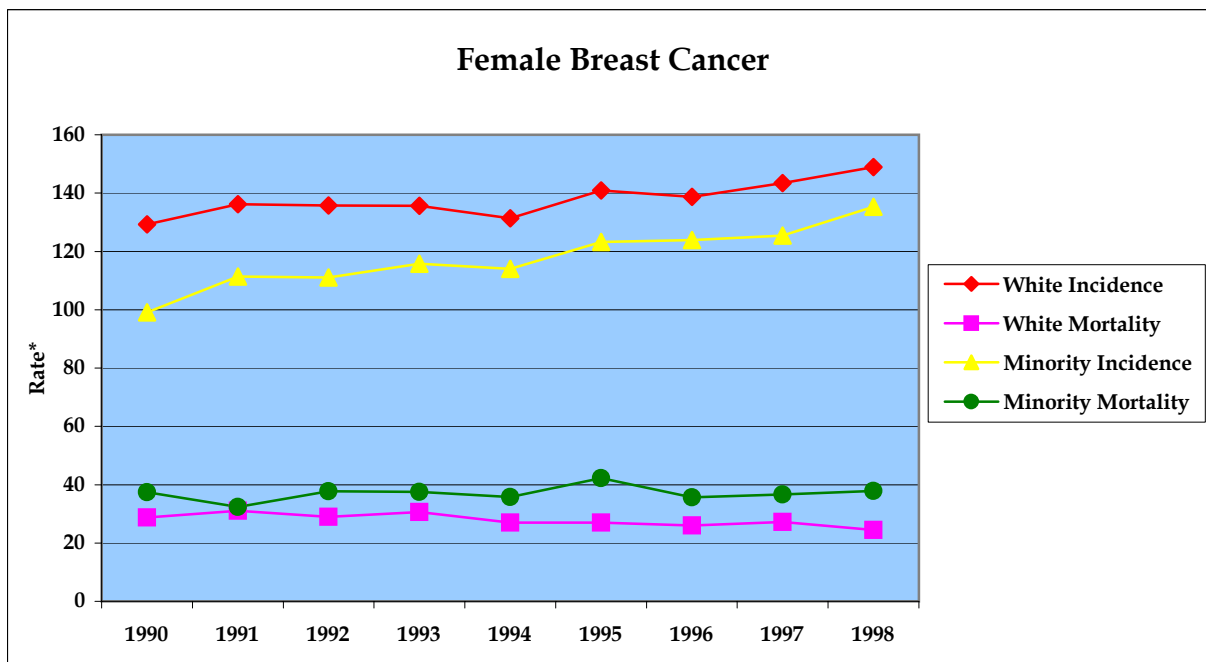
* Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

Chart 2: White/Minority Trends For The Four Major Cancers 1990-1998



* Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

Chart 2: White/Minority Trends For The Four Major Cancers 1990-1998



* Rates Per 100,000 Population
Age-Adjusted to the 2000 U.S. Census

**Table 10: Five Most Frequently Diagnosed Cancers By Age Group
1998**

**Ages
0-14**

Type	Cases	Rate*
Leukemia	64	4.1
Brain/CNS	52	3.4
Soft Tissue	17	1.1
Kidney	16	1.0
Endocrine	15	1.0

**Ages
15-19**

Type	Cases	Rate*
Non-Hodgkin's Lymphoma	14	2.8
Hodgkin's Disease	13	2.6
Brain/CNS	12	2.4
Leukemia	#	**
Bone	#	**
Endocrine	#	**

**Ages
20-24**

Type	Cases	Rate*
Melanoma(Skin)	27	5.1
Hodgkin's Disease	22	4.1
Testes ¹	21	7.6
Endocrine	10	1.9
Brain/CNS	#	**
Soft Tissue	#	**

**Ages
25-29**

Type	Cases	Rate*
Melanoma(Skin)	36	6.3
Endocrine	34	6.0
Testes ¹	28	9.7
Female Breast ¹	27	9.6
Hodgkin's Disease	27	4.7
Cervix Uteri ¹	20	7.1

The cancers listed are the five most frequently diagnosed cancers for each age group. Different age groups are at higher risks for different types of cancer. As age increases, risk of cancer increases.

*Rates Per 100,000 Population

Less than 10 cases observed.

** Rates based on less than 10 cases are unstable and therefore suppressed.

¹ Sex-specific populations are used to calculate rates for sex-specific cancers.

**Table 10: Five Most Frequently Diagnosed Cancers By Age Group
1998**

**Ages
30-34**

Type	Cases	Rate*
Female Breast ¹	94	32.8
Melanoma(Skin)	48	8.4
Testes ¹	36	12.7
Endocrine	32	5.6
Cervix Uteri ¹	32	11.2
Colon/Rectum	28	4.9

**Ages
35-39**

Type	Cases	Rate*
Female Breast ¹	254	82.8
Melanoma(Skin)	66	10.9
Colon/Rectum	64	10.6
Cervix Uteri ¹	42	13.7
Non-Hodgkin's Lymphoma	41	6.8

**Ages
40-44**

Type	Cases	Rate*
Female Breast ¹	431	142.8
Lung/Bronchus	106	18.0
Melanoma(Skin)	101	17.1
Colon/Rectum	87	14.8
Endocrine	48	8.1

**Ages
45-49**

Type	Cases	Rate*
Female Breast ¹	637	232.8
Lung/Bronchus	190	35.6
Colon/Rectum	162	30.4
Prostate ¹	86	33.1
Melanoma(Skin)	82	15.4
Non-Hodgkin's Lymphoma	82	15.4

*Rates Per 100,000 Population

** Rates based on less than 10 cases are unstable and therefore suppressed.

¹ Sex-specific populations are used to calculate rates for sex-specific cancers.

**Table 10: Five Most Frequently Diagnosed Cancers By Age Group
1998**

**Ages
50-54**

Type	Cases	Rate*
Female Breast ¹	694	291.9
Prostate ¹	504	287.3
Lung/Bronchus	362	78.4
Colon/Rectum	281	60.8
Melanoma(Skin)	96	20.8

**Ages
55-59**

Type	Cases	Rate*
Prostate ¹	728	496.1
Female Breast ¹	681	357.4
Lung/Bronchus	529	144.5
Colon/Rectum	301	82.2
Kidney	115	31.4

**Ages
60-64**

Type	Cases	Rate*
Prostate ¹	952	748.8
Lung/Bronchus	776	246.3
Female Breast ¹	674	400.4
Colon/Rectum	428	135.8
Bladder	147	46.7

**Ages
65-69**

Type	Cases	Rate*
Prostate ¹	952	748.8
Lung/Bronchus	950	335.0
Female Breast ¹	684	437.2
Colon/Rectum	527	185.8
Bladder	220	77.6

*Rates Per 100,000 Population

** Rates based on less than 10 cases are unstable and therefore suppressed.

¹ Sex-specific populations are used to calculate rates for sex-specific cancers.

**Table 10: Five Most Frequently Diagnosed Cancers By Age Group
1998**

**Ages
70-74**

Type	Cases	Rate*
Lung/Bronchus	1009	398.4
Prostate ¹	945	879.3
Female Breast ¹	717	491.8
Colon/Rectum	592	233.8
Bladder	224	88.4

**Ages
75-79**

Type	Cases	Rate*
Lung/Bronchus	774	396.9
Prostate ¹	657	873.4
Female Breast ¹	592	494.2
Colon/Rectum	533	273.3
Bladder	236	121.0

**Ages
80-84**

Type	Cases	Rate*
Colon/Rectum	415	331.2
Lung/Bronchus	407	324.9
Female Breast ¹	387	468.4
Prostate ¹	264	618.7
Bladder	151	120.5

**Ages
85+**

Type	Cases	Rate*
Colon/Rectum	354	339.5
Female Breast ¹	257	333.9
Lung/Bronchus	173	165.9
Prostate ¹	142	520.1
Bladder	133	127.6

*Rates Per 100,000 Population

** Rates based on less than 10 cases are unstable and therefore suppressed.

¹ Sex-specific populations are used to calculate rates for sex-specific cancers.

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*Cancer Incidence
In
North Carolina
1998*

Appendix A: Primary Site Definitions

International Classification of Disease for Oncology (ICD-O-2) Codes for Newly Diagnosed Neoplasms

Primary Site	ICD-O-2
All Sites	C000-C809
Oral Cavity and Pharynx:	C000-C148
❖ Lips	C000-C009
❖ Tongue	C019-C029
❖ Salivary Glands	C079-C089
❖ Floor of Mouth	C040-C049
❖ Nasopharynx	C110-C119
❖ Oropharynx	C100-C109
❖ Hypopharynx	C129-C139, C141
❖ Other Mouth and Pharynx	C030-C039, C050-C069, C090-C099, C140, C142-C148
Digestive System:	C150-C269, C480-C488
❖ Esophagus	C150-C159
❖ Stomach	C160-C169
❖ Small Intestine	C170-C179
❖ Colon and Rectum	C180-C209, C260
❖ Anus, Anal Cavity and Anorectum	C210-C218
❖ Liver and Intrahepatic Bile Duct	C220-C221
❖ Gallbladder	C239
❖ Pancreas	C250-C259
❖ Other Digestive Organs	C240-C249, C268-C269, C480-C488
Respiratory System:	C300-C399
❖ Larynx	C320-C329
❖ Lung and Bronchus	C340-C349
❖ Other Respiratory Organs	C300-C319, C339, C381-C399
Bones and Joints	C400-C419
Soft Tissues	C380, C470-C479, C490- C499
Skin	C440-C449
❖ Melanoma of Skin	C440-C449 (M8720-M8790)
❖ Other Skin	C440-C449 (Other histology)
Breast	C500-C509
❖ Invasive	C500-C509 (Behavior=3)
❖ In Situ	C500-C509 (Behavior=2)
Female Genital Organs:	C530-C589
❖ Cervix Uteri	C530-C539
❖ Uterus (Corpus, NOS)	C540-C559
❖ Ovary	C569
❖ Other Female Genital Organs	C510-C529, C570-C589
Male Genital Organs:	C600-C639
❖ Prostate	C619
❖ Testis	C620-C629
❖ Penis	C600-C609
❖ Other Male Genital Organs	C510-C529, C570-C589

Appendix A: Primary Site Definitions

International Classification of Disease for Oncology (ICD-O-2) Codes for Newly Diagnosed Neoplasms

Primary Site	ICD-O-2
Urinary System:	C649-C689
❖ Bladder	C670-C679
❖ Kidney and Renal Pelvis	C649-C659
❖ Ureter	C669
❖ Other Urinary System	C630-C639
Eye & Orbit:	C690-C699
Brain & Central Nervous System (CNS):	C700-C729
Endocrine System:	C379, C739-C759
❖ Thyroid	C739
❖ Other Endocrine and Thymus	C379, C740-C759
Lymphomas:	M9590-M9714
❖ Hodgkin's Disease	M9650-M9667
❖ Non-Hodgkin's	M9590-M9595, M9670-M9714
Multiple Myeloma:	M9730-M9732
Leukemia:	M9800-M9941
❖ Acute Lymphocytic	M9821
❖ Chronic Lymphocytic	M9823
❖ Acute Myeloid	M9861, M9867
❖ Chronic Myeloid	M9863, M9868
❖ Other Leukemia	M9800-M9820, M9822, M9824-M9860, M9862, M9864-M9866, M9870-M9941
Ill-Defined & Unspecified	C760-C768, C809 M9720-M9723, M9740-M9741, M9760-M9764, M9950-M9989 C420-C424 (M8000-M9589) C770-C779 (M8000-M9589)

Note: Except for lymphoma, multiple myeloma, and leukemia, all categorized sites exclude M9590-M9989 unless otherwise stated.

Appendix B: Mathematical Formulae

Mathematical definitions:

Age Group (I):

0-4	45-49
5-9	50-54
10-14	55-59
15-19	60-64
20-24	65-69
25-29	70-74
30-34	74-79
35-39	80-84
40-44	85+

Age-specific rate:

$$r_{ig} = (c_{ig}/n_{ig}) * 100,000$$

where r_{ig} is the age-specific rate for age group (i) and/or gender group (g), c_{ig} is the count of cases for that age group (i) and/or gender group (g), and n_{ig} is the count of persons at risk (i.e., the population) for that age group (i) and/or gender group (g); rates in all tables are presented per 100,000.

Observed:

- ◆ Male Observed = Number of males with cancer
- ◆ Female Observed = Number of females with cancer

Age-adjusted rate:

$$A.A.R. = \sum_{I=0-4}^{85+} (w_I r_I)$$

where w_I is the proportion of the age group in the 2000 U.S. Standard and r_I is the age-specific rate for age group.

Appendix C: Population Total By County And Race North Carolina, 1998

<i>County</i>	<i>White Males</i>	<i>White Females</i>	<i>Minority Males</i>	<i>Minority Females</i>
Alamance	46480	50232	11403	13549
Alexander	14979	14901	944	1078
Alleghany	4685	4999	80	90
Anson	5953	6307	5314	6450
Ashe	11415	12092	91	100
Avery	7550	7575	136	58
Beaufort	14447	15528	6135	7434
Bertie	3453	3843	5676	7060
Bladen	8537	9388	5742	7103
Brunswick	27661	28588	5151	5914
Buncombe	84012	91852	8210	9210
Burke	37737	38932	3729	3698
Cabarrus	51330	53570	7525	8249
Caldwell	34949	35991	2189	2275
Camden	2607	2427	661	683
Carteret	26656	27208	2536	2866
Caswell	6695	7020	4179	4486
Catawba	57535	60086	6666	7262
Chatham	17697	18629	4505	5107
Cherokee	10431	11326	556	469
Chowan	4373	4819	2282	2908
Clay	3912	4232	45	49
Cleveland	34485	36878	9667	10776
Columbus	16273	18002	8104	9787
Craven	33018	32115	11180	12695
Cumberland	95261	84976	53919	58588
Currituck	7800	7684	840	840
Dare	13492	13689	497	462
Davidson	62518	63785	7158	7913
Davie	14403	14922	1391	1440
Duplin	14703	14976	6674	7897
Durham	58081	61887	36994	43806
Edgecombe	10290	11407	14401	18604
Forsyth	101284	111065	35731	41616
Franklin	14792	15401	6586	7659
Gaston	75249	79299	12235	14262
Gates	3079	2978	1848	2088
Graham	3413	3437	280	332
Granville	14227	14235	7838	8210
Greene	5592	5333	3754	3666
Guilford	130943	142793	52747	61620
Halifax	11844	12892	14343	16343
Harnett	31272	32567	9265	10486
Haywood	24020	26585	485	528
Henderson	36945	40497	1668	1775
Hertford	3898	4366	5927	7371
Hoke	6698	6175	8452	8713
Hyde	1965	1978	832	966
Iredell	46725	48642	8392	9757
Jackson	12310	13572	1852	1824

Appendix C: Population Total By County And Race North Carolina, 1998

<i>County</i>	<i>White Males</i>	<i>White Females</i>	<i>Minority Males</i>	<i>Minority Females</i>
Johnston	43919	45258	8484	10056
Jones	2807	3022	1539	1897
Lee	18012	18739	5598	6409
Lenoir	16641	17820	10569	13561
Lincoln	26786	27345	2427	2526
McDowell	18605	19406	1048	1054
Macon	13110	14379	338	325
Madison	9204	9394	109	85
Martin	6742	7357	5296	6237
Mecklenburg	217222	226271	83966	97068
Mitchell	6951	7611	34	29
Montgomery	9035	8669	3702	3315
Moore	27707	30449	5941	6717
Nash	29201	31152	12717	15042
New Hanover	56678	61266	13616	16810
Northampton	4322	4400	5626	6404
Onslow	66562	46908	19795	15742
Orange	42629	47096	9232	10331
Pamlico	4569	4724	1226	1577
Pasquotank	10065	11177	6115	7409
Pender	13870	14222	4557	5465
Perquimans	3785	3897	1492	1773
Person	11223	11986	4732	5357
Pitt	40610	42936	19576	23521
Polk	7215	8312	536	604
Randolph	56786	58845	4105	4406
Richmond	14757	15705	6994	8051
Robeson	18608	20114	35397	40311
Rockingham	33922	36775	8712	10242
Rowan	50593	52426	10298	11400
Rutherford	25743	27290	3348	3675
Sampson	16890	17912	8361	10149
Scotland	9090	10051	7158	8902
Stanly	23505	24849	3415	3837
Stokes	20185	20819	1082	1112
Surry	31132	33566	1428	1802
Swain	4180	4190	1992	1806
Transylvania	13031	13788	724	773
Tyrrell	1126	1184	741	844
Union	45710	46617	8354	9429
Vance	10545	11582	9013	10550
Wake	217950	223920	62833	70125
Warren	3718	3826	5377	5995
Washington	3243	3554	2912	3394
Watauga	19352	20408	609	567
Wayne	39730	35635	17705	20230
Wilkes	29482	30509	1529	1797
Wilson	20148	21836	12148	15251
Yadkin	16590	17534	737	796
Yancey	7927	8469	104	80
North Carolina	2809087	2916881	850162	970960

Appendix D: U.S. Standard Million Population 2000

Ages 0-4	69135
Ages 5-9	72532
Ages 10-14	73032
Ages 15-19	72168
Ages 20-24	66478
Ages 25-29	64530
Ages 30-34	71044
Ages 35-39	80762
Ages 40-44	81851
Ages 45-49	72118
Ages 50-54	62716
Ages 55-59	48454
Ages 60-64	38793
Ages 65-69	34264
Ages 70-74	31773
Ages 75-79	27000
Ages 80-84	17842
Ages 85+	15508

Source: U.S. Bureau of the Census, Census of Population: 2000.